



iGEM 2016 Shad Valley – Day 1: A Primer on Synthetic Biology



By: Austin Boucinha

Presentation Outline

- Overview of Synthetic Biology
- Perspectives of Synthetic Biology
- Enabling Technologies of Synthetic Biology
- Genetics Lab Theory Overview
- Your Experiment @ Shad Valley Waterloo
- Connection between Genetic Manipulation and Synthetic Biology

What is Synthetic Biology?

Perspectives: Science & Engineering

So what allows us to do
Synthetic Biology?

Key Enabling Technologies of Synthetic Biology

- Standardized DNA Design
- DNA Synthesis
- DNA Sequencing
- Mathematical Modelling

Standardized DNA Design

BioBricks

DNA Synthesis

DNA Sequencing

A T C G

Mathematical Modelling

Genetics Theory Overview

- Central Dogma of DNA
- Plasmids and Restriction Enzymes
- BioBricks: The Plasmid Standard
- Cell Transformation & Competent Cells
- Plating Cells & The Observation of Colonies

The Central Dogma of DNA

Plasmids & Restriction Enzymes

BioBricks: The Plasmid Standard

Cell Transformation & Competent Cells

Plating Cells & The Observation of Colonies

Your Experiment @ Shad Valley Waterloo

The Link Between Genetic Manipulation & Synthetic Biology

Lab Safety

BEFORE WE CAN DO ANYTHING...

Why is lab safety Important?

Handling of Microbes

- Possible Pathogens
- Handling of Chemical Solutions
- Working with an open flame

Safety Equipment

Personal Protective Equipment (PPE)

- Lab Coats

- Closed Toe Shoes

- Gloves

- Long hair tied up

- Loose clothing tucked away

Workspace

Always sanitize with ethanol

Remove materials that are irrelevant to the experiment

Maintain Aseptic area with Bunsen Burner

Electronic devices prohibited

NO FOOD OR DRINKS

Store belongings in the provided lockers

Aseptic Technique

What is it?

Use of a flame to clean and
maintain area near flame
devoid of unwanted
contaminants

**NEVER LEAVE FLAME
UNATTENDED**

Clean Up!

All waste in proper bins

- Pipette tips

 - Nitril Gloves

 - Used Test tubes

 - Liquid Waste

 - Sticks

Clear Bench and wipe down paper with acetone/ethanol

In Case of Emergency

Eye Wash stations

Shower Stations

Fire Extinguisher

If unsure please come ask us!!

Thank You